

United Nations

Nations Unies

**ECONOMIC
AND
SOCIAL COUNCIL**

**CONSEIL
ECONOMIQUE
ET SOCIAL**

RESTRICTED

E/CH.7/W.37

11 May 1948

ORIGINAL: ENGLISH

COMMISSION ON NARCOTIC DRUGS

THIRD SESSION

STUDY ON CANNABIS SATIVA OR HEMP

Item 14 of the Provisional Agenda

NOTE BY THE ASSISTANT SECRETARY-GENERAL IN CHARGE
OF THE DEPARTMENT OF SOCIAL AFFAIRS

This study was prepared by the Secretariat to facilitate the
discussion by the Commission of Item 14 of the Provisional Agenda.

RECEIVED

70714 1948

/INDEX

INDEX

	<u>Page</u>
I. The Plant and its Products.	3
The plant.	3
The stalks	3
The seeds.	4
The resin.	5
II. Chemical Aspects of the Drug.	6
The active principles.	6
Chemical tests	7
Other constituents of hemp	7
III. Medical Aspects	9
The drug in medicine	9
The narcotic pleasure drug	9
IV. Some Questions Affecting Enforcement and Agreements .	11
Question of different kinds of Cannabis.	11
Question of nomenclature	12
V. Appendix.	13
Bibliographical references	13

CANNABIS SATIVA OR HEMP

I. THE PLANT AND ITS PRODUCTS

The Plant

Cannabis sativa, the hemp plant, is much used and also misused. The stalks provide a valuable textile fibre and the seeds a useful oil, while the resin, which coats the tops of the plants, is chiefly misused as an intoxicating drug.

This plant, probably native to Central Asia, has been cultivated from very ancient times for fibre, seed and resin, and is now spread over most of the world. It is extremely hardy and often escapes from cultivation. It is now a weed in many lands in which it has been cultivated, and even in some places where its introduction was never intentional. As a wild plant it grows chiefly on fertile but low-lying ground near streams and rivers, on railroad right-of-ways, in gullies, and along the fences around cornfields; generally speaking, on open waste-land where destruction of the weeds is not worthwhile economically.

The species is dioecious, producing pollen and seed on separate plants. The male and female plants partake of nearly equal growth at first, but the male plants begin to die immediately after shedding their pollen, while the female plants continue to grow, not much in height, but branching out laterally. In a thick stand of hemp one can scarcely tell, a few weeks later, where the male plants had been. The species is annual, but in temperate climates the female plants often live until killed by frost.

The mature hemp plants probably average about six feet in height, or close to two metres. On dry, infertile soil they may attain only a foot or two. On well-watered fertile soil, as for example near the Missouri River, United States of America, the plants frequently attain a height of thirteen to sixteen feet, or about four to five metres. The height and numerous other characteristics also depend considerably on the variety.

There are several varieties, including Cannabis sativa var. indica, commonly known as Cannabis indica. The great majority of botanists consider that there is only one species of hemp, Cannabis sativa L.^{(1)*}

The Stalks

The stalks yield a valuable fibre, very strong, coarser, harsher, and less pliable than flax, not readily bleached and so used chiefly where a dark colour is not objectionable. Formerly in many parts of the world it was the most important material in homespun fabrics, but is not now much

* All references will be found at the end of the document.

used for clothing. It was also formerly much used for ropes and ship-rigging; here it has been largely replaced by abacá ("Manilla hemp"). In other uses it has been partly replaced by jute, ramie and other fibres, but it is still valuable and much used for twine, cordage, carpet-warp, sail cloths, sacking, tarpaulin and belt-webbing. Hemp tow is used as oakum for packing pumps and engines, for marine purposes and in upholstery stuffing. Hemp hurds (the woody parts of the stalks) and hemp wastes can be used in paper-making.⁽¹⁾⁽²⁾

For fibre purposes hemp is grown in a great many countries in all parts of the world. The Union of Soviet Socialist Republics produces most; Italy, Hungary and Roumania have been large producers, Yugoslavia and Chile may also be noted as sizable producers. China and Japan are large producers but themselves consume nearly all they produce.

For fibre purposes the stalks are generally cut when the male plants are in full bloom.

Although cultivation for seed and for resin have had a part, it is chiefly the cultivation for fibre which has been responsible for the spread of hemp over the world, both in cultivation and as a wild plant.

The Seeds

Hemp is also cultivated in many lands for the seeds or fruits.⁽¹⁾

The fruits, commonly called seeds, are technically achenes. They contain some 20/30 per cent or more of a fixed oil which is valuable industrially. It is used for making paints and varnishes, and also for soft soaps. The Union of Soviet Socialist Republics and China, in Manchuria especially, are large producers of hemp seed.⁽³⁾

The oil is obtained by expression. The cake remaining is used for fertilizer, as bait for fish and as food for domestic animals. The whole seeds are valuable as food for caged birds, and are sometimes used to feed poultry. They are occasionally used also as food for human beings, and sometimes the oil is used in cookery. The flavour, however, is not admired, and is against these last-mentioned uses.

There have been reports of the seeds being crushed and mixed with tobacco and smoked by drug addicts. In a publication in 1941 Matchett and Loewe set out evidence that material having a "marihuana-like" activity can be extracted from the fruits of Cannabis sativa. Nothing was determined as to the chemical characteristics of the substance responsible. The conclusion was based on tests on dogs, and these tests indicated one-thirtieth to one-hundredth as much potency for the seeds as for the dried marihuana tops (the crude drug) in the illicit trade.⁽⁴⁾ Dewey remarks that in

medieval times in Europe the "seeds were cooked with barley and other grains and eaten, though it was found dangerous to eat too much or too frequently." There do not appear to be any reports that hemp seeds are ever eaten for a narcotic effect or as a pleasure-drug, nor any reports that when eaten for food they have ever caused addiction or even euphoria. The seeds are usually removed from the crude drug before it is smoked.

The seeds have had a very slight use in medicine, but only on account of their oil content, and in no way as an active drug.

The Resin

The inflorescence and the leaves and stems, particularly at the top of the plant, are coated with a sticky resin. Chemical tests for certain constituents of the resin have shown that it is already present on tiny seedlings that have just developed their first true leaves. Up to the time of flowering the male and female plants produce resin equally, or nearly so, and of the same kind, whether tested chemically or physiologically. However, as already mentioned, after shedding their pollen the male plants soon die, and so if the tops for drug purposes are collected later in the year, as they usually are, they come, naturally, from the female plants only. The belief that the male plants do not produce the drug at all is quite unfounded.

The crude drug consists of the dried tops of the plants, with adherent resin. The physiological effects are principally due to this resin, though possibly some constituents of the leafy and woody parts may have some effects of a different kind. The belief that the drug properly or necessarily consists only of the unfertilized tops of the female plants, or the resin from them, is a curious one. In support of this it is true that on many of the plantations in India the male plants are exterminated with great care, before they can shed their pollen. Perhaps the female plants then make better growth and produce more resin. Perhaps the object is to prevent any pollen getting in the drug; for many people are allergic to hemp pollen. It is quite certain that the resin from the fertilized tops, full of seed, is potent; and in most parts of the world it is the fertilized tops that are used.

The resin is insoluble in water but soluble in alcohol, organic solvents in general and petroleum ether. Often it is separated more or less completely from the leaves and stems, either by mechanical means or by solution in alcohol or some other solvent. In this way more potent preparations are obtained, which are, however, still crude drugs in which the active principles are mixed with much inert or undesirable material.

II. CHEMICAL ASPECTS OF THE DRUG

The Active Principles

The chemistry of the resin was formerly much confused, and some of the confusion still persists, even in some recent reference books. Much of it relates to the word "cannabinol". This term has been used for a toxic "red oil" obtained from the resin by distillation under greatly reduced pressure. However, Dunstan and Henry in 1898, and Wood, Spivey and Easterfield the following year, isolated a definite chemical compound as the crystalline acetate, and named this cannabinol. In the following years, until 1931, several chemists, without being able to confirm this separation, obtained an oily isolate which they called "cannabinol". Actually their products were mixtures of some closely related compounds, but such a mixture behaves in many ways like a pure substance. Finally, in 1931, Cahn again isolated the pure cannabinol, a definite chemical compound; and in recent years several chemists have obtained it. Unfortunately this pure cannabinol proved not to be "the" active principle, although it is toxic and according to some recent research does have the specific narcotic effect in some slight degree. The specific narcotic effect of the Cannabis drug is, however, resident in the "crude cannabinol" or the distilled mixture of compounds related to and including the pure cannabinol. To this is due the statement in many reference books that cannabinol is the active principle. This is incorrect, according to the nomenclature now accepted by chemists. (5)(6)

In 1940 Adams, Hunt and Clark reported the isolation of another definite compound, this being obtained from the "marihuana extract" of Minnesota wild hemp. They named it cannabidiol. It is not the active principle either. However, Adams and his collaborators went on to show that cannabidiol isomerizes to tetrahydrocannabinol, which does have "marihuana activity". (7)(8)

As a result of further work by Adams and collaborators in the United States, Todd and collaborators in England, and other chemists, the structure and syntheses of cannabinol and cannabidiol and numerous derivatives have been established. (9)(10)(11)

Jacob and Todd also isolated cannabiol, an isomer of cannabidiol which likewise has little narcotic effect. (12) Wollner, Matchett, Levine and Loewe in 1942 reported on the isolation of natural tetrahydrocannabinol from charas. It was not obtained in crystalline form. (13) A number of different isomeric substances are possible which are entitled chemically to the name tetrahydrocannabinol and it is probable that several exist in /the hemp plant.

the hemp plant. It is generally agreed now that the chief active components of hemp resin are tetrahydrocannabinols.

Two groups of researchers have isolated narcotically active substances from the resin in crystalline form. Very little, however, is known about the substances; one called cannin and the other unnamed but perhaps a methylcannabinol. (14)(15)

Fulton has shown that some of the compounds related to cannabinol are soluble in aqueous alkali, at least from fresh resin. (16) This work in part followed a separation discovered by Myttenaere, and was soon after amplified and in part more correctly explained by Madinaveitia, Russell and Todd. (17)(18) It appears that alkali solubility is conferred by combination with a phenolic acid. Very few researchers have done any work on fresh resin direct from the green plants, and the majority have used the distilled oil exclusively.

Tetrahydrocannabinol, hexahydrocannabinol and numerous homologs and analogs having "marihuana activity", or a narcotic effect similar to that of cannabis resin, can now be produced synthetically, either from cannabidiol and cannabinol, or by a chain of syntheses from materials not derived from the hemp plant. In 1945 Adams, Chen and Loewe reported on various synthetics, including one even more potent than the most active natural isolate thus far obtained. (19)

All of the substances related to cannabinol, discussed above, are compounds of carbon, hydrogen and oxygen only. They are not alkaloids.

Chemical Tests

The Alkaline Beam test is due to cannabidiol and closely related compounds of similar structure. The Acid Beam test using a petroleum ether extract is probably due to a glucoside of one (or more) of the "cannabinol compounds". Most of the other tests that have been found especially useful and characteristic for the drug appear to be due to all the "cannabinol compounds" - cannabinol, cannabidiol, tetrahydrocannabinol and the other closely related compounds which occur in hemp resin.

Other Constituents of Hemp

Although other constituents have only a minor importance it may be well to make mention of some of them that have been identified.

The characteristic odour of the hemp plant, and of the resin, is not due to the physiologically active part, but to an "essential oil" which can be much more easily distilled. The most thorough analysis of this was reported on by Simonsen and Todd in 1942. This particular oil was obtained from Egyptian hashish. The low-boiling terpene consisted mainly of

/p-cymene

p-cymene and 1-methyl-4-isopropenylbenzene. The higher boiling fractions contain humulene (d-caryophyllene), hitherto found only in oil of hops and oil of cloves. The hop plant (*Humulus lupulus*) and hemp belong to the same botanical family.⁽²⁰⁾

A paraffine hydrocarbon is also present in the resin, identified as n-nonacosane.⁽⁵⁾

Having fractionated red oil from a crude ethanolic hemp extract, Adams, Pease and Clark in 1940 reported on the isolation of quebrachitol, a water-soluble substance, the monomethyl ether of 1-inositol, $C_6H_6(OH)_6$.⁽²¹⁾

The presence of an alkaloid in the crude drug, or even in the resin, has often been claimed or assumed. Practically nothing definite is known of any alkaloid peculiar to hemp. However, choline, trigonelline and muscarine have been reported by different investigators as present in the crude drug. Choline is a nitrogenous base but is usually not classed as an alkaloid. It is very widespread in both the vegetable and animal kingdoms. Trigonelline is found in the seed of Trigonella foenum-graecum L. It is also present in coffee and is said to be non-toxic. Muscarine is found in Amanita muscaria L, a poisonous mushroom. It is highly toxic. The reported presence of muscarine in hemp perhaps should be investigated further. Trigonelline and muscarine are generally classed as alkaloids.⁽²²⁾

Some hemp contains considerable amounts of red anthocyanin pigment, as well as chlorophyll.

III. MEDICAL ASPECTS

The Drug in Medicine

Hemp has only a small use in medicine. It has been used to relieve pain, to encourage sleep, soothe restlessness, produce euphoria, relieve migrainic headaches, in psychiatric studies, etc. This is not to say that it is always successful in such cases. The great obstacle to its use has been the enormous variation in potency of different samples. The United States Pharmacopoeia, which has now dropped Cannabis entirely, formerly (Tenth Revision) required a biological standardization. The authors of "The Dispensatory of the United States of America" comment that the method was "able to distinguish inert samples from active ones but not even approximately reliable as a quantitative measure". (3)

The extract of hemp was also traditionally used in corn medicines, but in such use it seems to have had no possible effect except to colour the preparation with the chlorophyll which it contains.

There is still no method for chemical standardization, and the use of Cannabis in medicine is at a very low point indeed. However, now that the chemistry of the resin is better understood, it is possible that a chemical method for standardization may be worked out. Or, natural isolates may possibly come into use. Also, synthetic products derived from compounds of hemp resin or analogous to tetrahydrocannabinol may be found useful in certain treatments. A bibliography relative to synthetic products has been prepared.

The Narcotic Pleasure Drug

In many parts of the world hemp is used, or misused, as a stupefying narcotic pleasure-drug. It is thus used especially in India, Nepal, Sinkiang, Iran and Arabia; in Egypt, Tunis, Morocco and by the native races in other parts of Africa; and in the West Indies, Brazil, Mexico and some other Latin-American countries. Egypt is not a producer but is a large consumer in the illicit trade; most of the other countries produce their own narcotic hemp, either legally or illegally. The drug use has spread from these countries to many others, for instance from Mexico to the United States and Canada.

The drug may be smoked, eaten, or drunk. Smoking is most common. In the western hemisphere smoking cigarettes made from the dried tops of the plants alone or mixed with tobacco is about the only form of indulgence in this drug. Usually the dried herb is broken up, and most of the seeds (if present) and the larger pieces of stems are removed. Sometimes these are carefully sifted out; but otherwise there is no

/especial

especial preparation. In Egypt and in Asia the use of more potent preparations is very common. Charas, the crude resin, is also smoked. Sweetmeats and confections of various kinds are prepared from the resin or the powdered crude drug with sugar or honey and spices, and eaten. Another preparation is made by heating the drug with butter and water. The resin blends with the melted butter and yields a very potent product. Sometimes the powdered drug is stirred up in water and the whole drunk. The resin is not soluble in water so this last is not a method of concentration but simply another way of ingesting the drug. The drug may be extracted with a strong alcoholic beverage; or an extract with alcohol may be used to prepare a beverage. The combined effects of hashish and alcohol are thus obtained, but if the preparation is at all concentrated the effects of the hemp greatly predominate. (23)(24)

Sometimes the hemp drug is mixed with opium for eating. It is also sometimes mixed with hyoscyamus; this is sometimes unknown to the one who takes it and is done to weaken the will of the victim or facilitate robbery or rape. (25) Many of the spices and other substances used in Near-Eastern preparations have a reputation as aphrodisiacs in Arab medicine. (24) In the United States some marihuana cigarettes have been found to contain crushed aspirin tablets. Presumably this is thought to add a little extra effect.

The Cannabis drug is a stupefying narcotic; it perverts the senses of time and space; stimulates the imagination; produces euphoria or sometimes apprehension; sometimes causes aphrodisia; sometimes induces uncontrolled and criminal violence, double-consciousness, or a sense of "the soul being separated from the body", and dreams, also result; suggestibility, hallucinations, acute sensitivity to sound and oneiric ecstasy are also noted. The experience usually ends with somnolence. Unlike opium, abrupt withdrawal is not harmful, even in the case of confirmed addicts. (23)(24)

IV. SOME QUESTIONS AFFECTING ENFORCEMENT AND AGREEMENTS

The Question of Different Kinds of Cannabis

It is often believed that the fibre and resin producing varieties of Cannabis are distinct. Usually this rests on nothing except an idea held by people who are acquainted with hemp only as a fibre plant, that this cannot be the same plant as the one which produces such remarkable effects when consumed as a drug. The idea is fallacious. There is no possible doubt whatever that in some cases the same variety, grown in the same field, will yield satisfactory fibre, prolific seed production and a highly potent resin.

This is not always the case, since there are a number of varieties, some best for fibre, some for seed and some for resin. However, another idea, that potent resin can only be obtained in tropical climates, is also largely fallacious. It persists in spite of the fact that the potency of resin produced in Central Europe or in Central or Northern United States of America has been demonstrated a number of times. No doubt, Cannabis sativa var indica, a variety acclimated to hot regions, cannot be very successfully grown in a northern region having a completely different climate and a different length of growing season. This really has little to do with the alleged incapacity of the species to produce potent resin in temperate climates. Cannabis of Manchurian origin, grown in Minnesota, United States of America, produced highly potent resin. As a matter of fact, much charas - the extremely potent crude resin - is said to be produced in Sinkiang, which can scarcely be called a tropical region.

Clearly when a country finds it necessary to regulate the culture of Cannabis, some restrictions may be necessary on any and all varieties of the species. However, it is possible that besides this, the culture of a certain variety, or varieties, known or believed to be the source of unusually potent drugs, and of less use otherwise, might well be totally prohibited. There is a certain advantage in this, because the growing of a highly potent variety, of less use for fibre than the kind usually grown - especially when it is grown in the middle of a field, surrounded by the ordinary fibre variety - is clear proof of criminal intention. Syria, Bulgaria and Turkey have at various times reported that they permit the culture of Cannabis sativa but prohibit that of "Cannabis indica". The fields are inspected for the prohibited variety.

Although no chemical assay for the potency of the resin is yet available, some progress has been made in differentiating varieties from this point of view. One kind produces comparatively little resin, but

/this resin

this resin is probably rather potent in proportion to its amount. Another kind produces considerable resin but in relation to its amount the resin is not very active physiologically. The varieties which produce the most resin of all are the same, apparently, that produce the most potent resin. Considering only the kind of resin, and not its amount, there appear to be two main types of plants, which can be distinguished chemically by the nature of the resin produced. Both types are smoked by addicts, but the hemp which has least cannabidiol (and compounds of the same type) in relation to the largest total of all the compounds related to cannabinol, is the kind preferred. The two types have been evident in the illicit traffic in Chicago, U.S.A. There, the more potent kind is said to have been smuggled in from Mexico; but observations in Minnesota indicated that the distinction is primarily one of variety, and only secondarily, if at all, dependent on climate.

Question of Nomenclature

The term "Indian hemp" ("chanvre indien") for the drug is rather unfortunate. First, it implies that the drug is obtained only from variety indica. Enquiries as to the cultivation of the plant are generally misunderstood as not applying to the fibre plant; and there are other disadvantages. Secondly, the term is a source of confusion, because other plants in no way related are often called "Indian hemp" - sometimes referring to fibre plants of India, sometimes to a native plant of North America (chanvre du Canada, Canadian hemp, Apocynum cannabinum). The term "hemp" is also applied to other fibres, such as "Manilla hemp" (abacá), and sometimes to the plants from which they are derived.⁽²⁶⁾ The most suitable term for the drug and the plant would appear to be Cannabis (Cannabis sativa, cannabis drug). The botanical genus comprises only the one species, and no confusion exists as to the meaning.

V. APPENDIX

Bibliographical References

The following references by no means present a complete bibliography. They supply rather a minimum bibliography for confirmation of certain points and amplification of others.

- (1) "Hemp", by Lyster H. Dewey. Yearbook of the United States Department of Agriculture for 1913, pages 283-346. (Includes botanical description and history of cultivation, especially as a fibre plant).
- (2) Economic Plants, by Ernest Elwood Stanford. D. Appleton-Century Co. New York, 1934.
- (3) The Dispensatory of the United States of America. Horatio C. Wood, Arthur Osol, Heber W. Youngken and Louis Gershenfeld. 23rd edition. J. B. Lippincott Co., Philadelphia, London, Montreal, 1943.
- (4) "On the Preparation of an Extract Having 'Marihuana-like' Activity from the Fruits of *Cannabis Sativa*". John R. Matchett and S. Loewe. Journal of the American Pharmaceutical Association, Scientific Edition vol. 30, No. 5, May 1941. (In Archives file 12-23615-6049, jacket No. 2)
- (5) "A Critical survey of the literature dealing with the chemical constituents of *Cannabis sativa*". A. H. Blatt. Journal of the Washington Academy of Sciences 28,465 (1938). (In Archives file 12-23615-6043, jacket No. 2).
- (6) "Marihuana Activity of Cannabinol". S. Loewe. Science 102, 615-616 (1945).
- (7) "Structure of Cannabidiol, a product isolated from the Marihuana Extract of Minnesota Wild Hemp. I." Roger Adams, Madison Hunt and J. H. Clark. Journal of the American Chemical Society. 62, 196-200 (1940). (In Archives file 12-23615-6043, jacket No. 3)
- (8) "Conversion of Cannabidiol to a Product with Marihuana Activity". Roger Adams, D. C. Pease, C. K. Cain, B. R. Baker, J. H. Clark, Hans Wolff and R. B. Wearn. Journal of the American Chemical Society 62, 2245-2246 (1940). (In Archives file 12-23615-6043, jacket No. 3)
- (9) "Marihuana". Harvey Lecture 19 February 1942. Roger Adams. Bulletin of the New York Academy of Medicine, November 1942.
- (10) "The Chemistry of Hashish". A. R. Todd. The Scientific Journal of the Royal College of Science 12, 37-45 (1942).
- (11) "Hashish". A. R. Todd. Experientia 2, 55-60 (1946).
- (12) "Cannabidiol and Cannabiol, constituents of *Cannabis indica* resin." A. Jacob and A. R. Todd. Nature 145,350 (1940).

/(13) "Isolation of

- (13) "Isolation of a physiologically active tetrahydrocannabinol from Cannabis sativa resin". H.J. Wollner, John R. Matchett, Joseph Levine and S. Loewe. Journal of the American Chemical Society, 64, 26-29 (1942).
- (14) "A Physiologically Active Principle from Cannabis Sativa (Marihuana)". A.J. Haagen-Smit, C.Z. Wawra, J.B. Koepfli, G.A. Alles, G.A. Feigen, A.N. Prater. Science 91, 602-603 (1940). (In Archives file 12-23615-6043, jacket No. 2)
- (15) "Active Principle of Marihuana". G. Powell, M.R. Salmon, T.H. Bembry and R.P. Walton. Science 92, 522-523 (1941).
- (16) "Analytical Classes of Cannabinol Compounds in Marihuana Resin". Charles C. Fulton. Industrial and Engineering Chemistry, Analytical Edition, 14, 407-412 (1942).
- (17) "Fourth Note on Indian Hemp" and "Supplement". "Sixth Note on Cannabis". F. de Mytteraere. League of Nations Documents O.C.1724(a) and Addendum (1938) and O.C. Cannabis/13 (1939). Also J. Pharm, Belg. 20, 341, 357, 683, 702 and 723 (1938) and 22, 163 (1940).
- (18) "Cannabis Indica. Part XI. An Examination of the Alkali-Soluble Portion of American Hemp Resin." (Mrs.) A. Madinaveitia, P.B. Russell and A.R. Todd. Journal of the Chemical Society, 1942, 628-630. (In Archives file 12-34180-6043).
- (19) "Tetrahydrocannabinol homologs with a sec-alkyl group in the 3-position, XVI." Roger Adams, K.H. Chen and S. Loewe. Journal of the American Chemical Society 67, 1534-1537 (1945).
- (20) "Cannabis indica. Part X. The essential oil from Egyptian hashish." J.L. Simonsen and A.R. Todd. Journal of the Chemical Society 1942, 188-191. (In Archives file 12-34180-6043.)
- (21) "Isolation of cannabinol, cannabidiol and quebrachitol from red oil of Minnesota wild hemp." Roger Adams, D.C. Pease and J.H. Clark. Journal of the American Chemical Society 62, 2194-2196 (1940). (In Archives file 12-23615-6043, jacket No. 3)
- (22) The Merck Index, 5th edition, 1940. Merck & Company, Rahway, New Jersey.
- (23) Marihuana, America's New Drug Problem. Robert P. Walton, J.B. Lippincott Co., Philadelphia, 1938.
- (24) "Present State of Documentation concerning Cannabis and the Problems to which it gives rise." J. Bouquet, League of Nations, O.C./ Cannabis 3, 12 April 1939.
- (25) "Subcommittee on Cannabis. Progress report on the Subcommittee's Work." League of Nations, O.C. 1724(b). 1 June 1938.
- (26) "Vegetable Products Wrongly Designated as Hemp." J. Bouquet. League of Nations, O.C. 1724, 31 March 1938; also O.C.1724(b), 1 June 1938.